

TSMC-02-405



March 9, 2004

TO: Commissioner for Patents  
P.O.Box 1450  
Alexandria, VA 22313-1450

Fr: George O. Saile, Reg. No. 19,572  
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Subject: | Serial No. 10/766,596 01/27/04 |  
Baw-Ching Perng et al.  
ZIRCONIUM OXIDE AND HAFNIUM OXIDE  
ETCHING USING HALOGEN CONTAINING  
CHEMICALS  
| \_\_\_\_\_ |

#### INFORMATION DISCLOSURE STATEMENT

Enclosed is Form PTO-1449, Information Disclosure Citation  
In An Application.

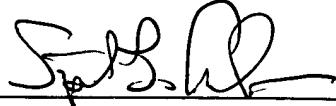
The following Patents and/or Publications are submitted to  
comply with the duty of disclosure under CFR 1.97-1.99 and  
37 CFR 1.56.

#### CERTIFICATE OF MAILING

I hereby certify that this correspondence is being  
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P.O. Box 1450, Alexandria, VA 22313-1450, on March 16, 2004.

Stephen B. Ackerman, Reg.# 37761

Signature/Date

 3/16/04

U.S. Patent 6,306,715 to Chan et al., "Method to Form Smaller Channel with CMOS Device by Isotropic Etching of the Gate Materials," describes a method for isotropically etching a metal oxide such as  $\text{HfO}_2$ .

The following two U.S. Patents provide for a method of removing a high k dielectric layer such as  $\text{Ta}_2\text{O}_5$ ,  $\text{ZrO}_2$ , and  $\text{HfO}_2$  by reducing the metal oxide to a metal or to a metal hydride which is then etched by an acid solution:

- 1) U.S. Patent 6,300,202 to Hobbs et al., "Selective Removal of a Metal Oxide Dielectric."
- 2) U.S. Patent 6,432,779 to Hobbs et al., "Selective Removal of a Metal Oxide Dielectric."

U.S. Patent 6,297,539 to Ma et al., "Doped Zirconia, or Zirconia-Like, Dielectric Film Transistor Structure and Deposition Method for Same," describes a means of improving the electrical properties of  $\text{ZrO}_2$  and  $\text{HfO}_2$  by doping with a trivalent metal.

Sincerely,



Stephen B. Ackerman,  
Reg. No. 37761

(Use several sheets if necessary)

Agitation Number

10 | 766, 596

significant

Applicant: Baw-Ching Perng et al.

Filing Date:

01/27/04

Oranu 2144

DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.